STATE OF NEW HAMPSHIRE
INTER-DEPARTMENT COMMUNICATION

DATE: August 8, 2019

FROM: SEL on behalf of Andrew O'Sullivan
Wetlands Program Manager

AT (OFFICE): Department of Transportation
Bureau of Environment

SUBJECT Dredge & Fill Application
Dixville, 42398
NHDES # 2019-012335

TO Joseph Schmidl, Wetlands Specialist
New Hampshire Wetlands Bureau
29 Hazen Drive, P.O. Box 95
Concord, NH 03302-0095

Included and enclosed are responses and additional information to address the request for more information letter dated July 11, 2019 and received by NHDOT on July 15, 2019 for the subject NHDOT Bureau of Bridge Maintenance project in the town of Dixville, NH along NH Route 26 over Flume Brook. In accordance with NHDES' and NHDOT's LEAN agreement the following responses are numerated analogously to the RFMI letter. The RFMI required plan revision which constitutes this as a level 2 RFMI and under the RFMI LEAN agreement NHDOT has 30 days to respond and DES has 7 days from a complete RFMI response to issue the permit. Goal of the LEAN event was to factor the RFMI process into the 89 day timeframe. The RFMI letter came 18 days prior to the target date.

Below are responses to the RFMI Letter:

1. Through NHDES' and NHDOT's RFMI LEAN event it was agreed that due to the nature of maintenance work done through NHDOT Operations projects right-of-way (ROW) boundaries were not required to be shown on impact plans. All work will be done within NHDOT ROW.

2. Shoreline Frontage to Flume Brook = 148'

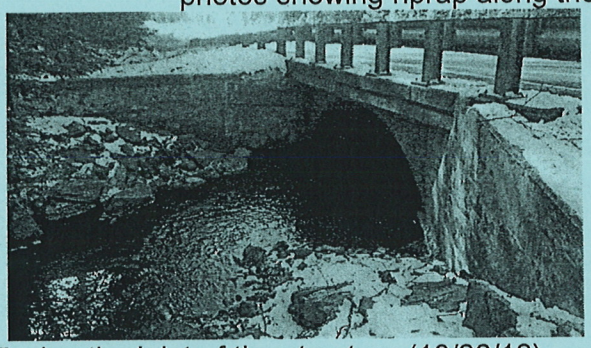
3. The areas of permanent impact are shown on the impact plan using standard NHDES wetlands impact symbols. Impact areas were overlaid with riprap hatching to indicate the location of the riprap scour protection. The riprap will be placed to restore the bank and channel back to its existing topography. A note indicating this was added to the impact plans. *(*Per NHDES' and NHDOT's RFMI LEAN event for Operations project NHDOT will include existing and proposed contours as well as structure invert elevations on plans when possible.)*

4. Attached with this response on sheet one of the revised wetland impact plans is a typical cross-section for rip-rap bank stabilization. The rip-rap size gradation was previously submitted on the wetland impact plans however a cross section was missing. Please find the attached edited 404.04 form as well for additional details such as minimum and maximum stone size, thickness, and bedding material.

5.

a. The proposed rehabilitation work will not change the inlet and outlet invert elevations. A note indicating this was added to the impact plans. *(*Per NHDES' and NHDOT's RFMI LEAN event for Operations project NHDOT will include existing and proposed contours as well as structure invert elevations on plans when possible.)*

b. See impact plan for area of impact associated with rip-rap installation. Riprap will be placed where riprap currently and previously existed. Attached are two additional photos showing riprap along the river left bank.



Facing the Inlet of the structure (10/26/18)

Facing downstream at SE Bank (10/26/18)

c. See impact plan. Labels for the road center line and edge of pavement (EOP) have been added to the impact plans.

6. NHDOT Wetlands Program classified Flume Brook as a R3UB12 – Riverine, Upper Perennial, Unconsolidated Bottom, Cobble Gravel & Sand wetland system based on site conditions observed during the wetland delineation. Streambed materials at the inlet, outlet, and through the structure can been seen in the photos provided with the application submittal and the above additional photos.

7. On the construction sequence submitted with the wetlands permit application, NHDOT Bridge Maintenance indicated that the work will be completed at normal to low flow and that a cofferdam will be placed within the stream to divert water to one side of the stream channel. Also in the sequence it indicates that the work zone will be dewatered or contained. On the wetland impact plan Bridge Maintenance included a sediment basin to pump water to in order to dewater the site. (The sediment basin is located a minimum of 20ft away from wetland resources). A clean water bypass and other Best Management Practices that will be implemented on the project site are shown on the Erosion Control Plan sheet. In regards to 7 a-e, NHDOT has exercised appropriate engineering judgment in the project's design (RSA 482-A: 3 I-a).

   RSA 482-A:3 I-a. *"Notwithstanding any law or rule to the contrary, in reviewing requests proposed, sponsored, or administered by the department of transportation, there shall be a rebuttable presumption that there is a public need for the requested project, and that the department of transportation has exercised appropriate engineering judgment in the project's design."*

8. The structure is drawn to scale on the impact plans provided with the application submittal. Based on the information provided in the impact plans and within the response to Env-Wt 404.04 NHDOT feels that there is sufficient information related to bed material and backfill

zones. NHDOT has also exercised appropriate engineering judgment when designing this project (RSA 482-A: I-a).

9. As indicated on the watershed map the crossing will continue to pass the streamstats Q50 storm and will accommodate the Q100 storm but will overtop at 602.54 cfs. The proposed rehabilitation work will not change the existing condition. Included are the HydroCad calculations that determined this.

If and when this response to the request for more information meets the approval of the Bureau, please send the permit directly to Andrew O'Sullivan, Wetlands Program Manager, Bureau of Environment.

SEL:sel
Enclosures

cc:
BOE Original
Bureau of Bridge Maintenance

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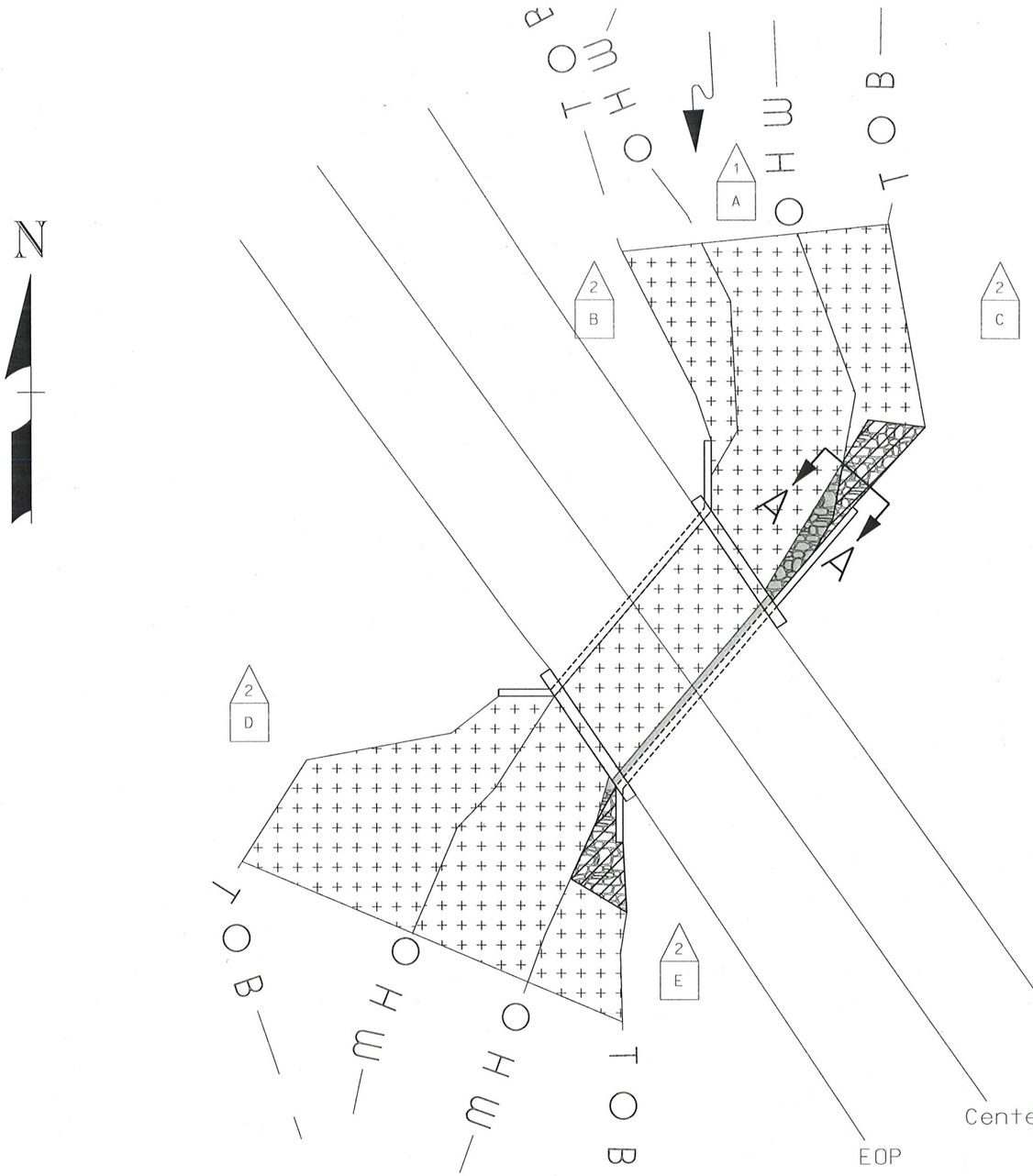


WETLAND IMPACTS

SCALE: 1" = 20'-0"

10 0 10 20

SCALE IN FEET

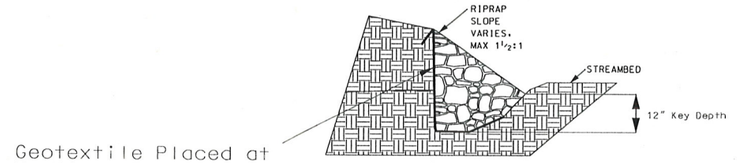
RRIPRAP	
NEW HAMPSHIRE WETLANDS BUREAU (PERMANENT NON-WETLAND)	
NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (PERMANENT WETLAND)	
TEMPORARY IMPACTS	

RIPRAP GRADATION

D15 < 16"

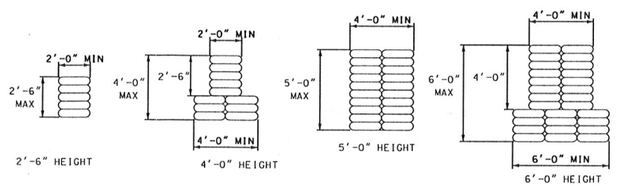
D50 < 21"

D100 < 36"



SECTION A-A

NOT TO SCALE



COFFERDAM DETAILS

NOT TO SCALE

STATE OF NEW HAMPSHIRE
TIMOTHY MAIN BOOBEY
No. 12189
LICENSED
PROFESSIONAL ENGINEER

*Note: Contours in areas of permanent channel and bank impacts, will be brought back to existing condition.

The inlet and outlet inverts will not change as a result of the proposed rehabilitation and scour protection work.

All work will be completed with the NHDOT ROW.

STATE OF NEW HAMPSHIRE

DEPARTMENT OF TRANSPORTATION * BUREAU OF BRIDGE MAINTENANCE

TOWN DIXVILLE BRIDGE NO. 206/101 STATE PROJECT 42398

LOCATION NH 26 OVER FLUME BROOK

WETLAND IMPACT PLAN

BRIDGE SHEET 1 OF 3

REVISIONS AFTER PROPOSAL	BY	DATE		BY	DATE
	DESIGNED DBL	3/15/19	CHECKED		
	DRAWN DBL	3/15/19	CHECKED		
	QUANTITIES		CHECKED		

ISSUE DATE	FISCAL YEAR	CREW	SHEET NO.	TOTAL SHEETS
REV. DATE	2012	01	1	3

FILE NUMBER DIXVILLE 206/101

Dixville 206/101

WETLAND IMPACT SUMMARY

WETLAND NUMBER	WETLAND CLASSIFICATION	LOCATION	AREA IMPACTS						LINEAR STREAM IMPACTS FOR MITIGATION		
			PERMANENT				TEMPORARY		PERMANENT		
			N.H.W.B. (NON WETLAND)		N.H.W.B. & A.C.O.E. (WETLAND)				BANK LEFT	BANK RIGHT	CHANNEL
			SF	LF	SF	LF	SF	LF	LF	LF	LF
1	R2UB12	A			89	65	1739	118			
2	BANK	B					245	35			
2	BANK	C	82	21			313	34			
2	BANK	D					694	40			
2	BANK	E	70	15			179	16			
		TOTAL	152	36	89	65	3170	243	0	0	0

PERMANENT IMPACTS: 241 SF
TEMPORARY IMPACTS: 3170 SF

TOTAL IMPACTS: 3411 SF

SUBTOTALS		PERMANENT				TEMPORARY	
		N.H.W.B. (NON WETLAND)		N.H.W.B. & A.C.O.E. (WETLAND)			
CLASS	DESCRIPTION	SF	LF	SF	LF	SF	LF
R2UB12	RIVERINE	0	0	89	65	1739	118
BANK	BANK	152	36	0	0	1431	125

R3UB12-Riverine, Upper Perennial, Unconsolidated Bottom, Cobble Gravel & Sand Bank

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION * BUREAU OF BRIDGE MAINTENANCE

TOWN DIXVILLE BRIDGE NO. 206/101 STATE PROJECT 42398
LOCATION NH 26 OVER FLUME BROOK

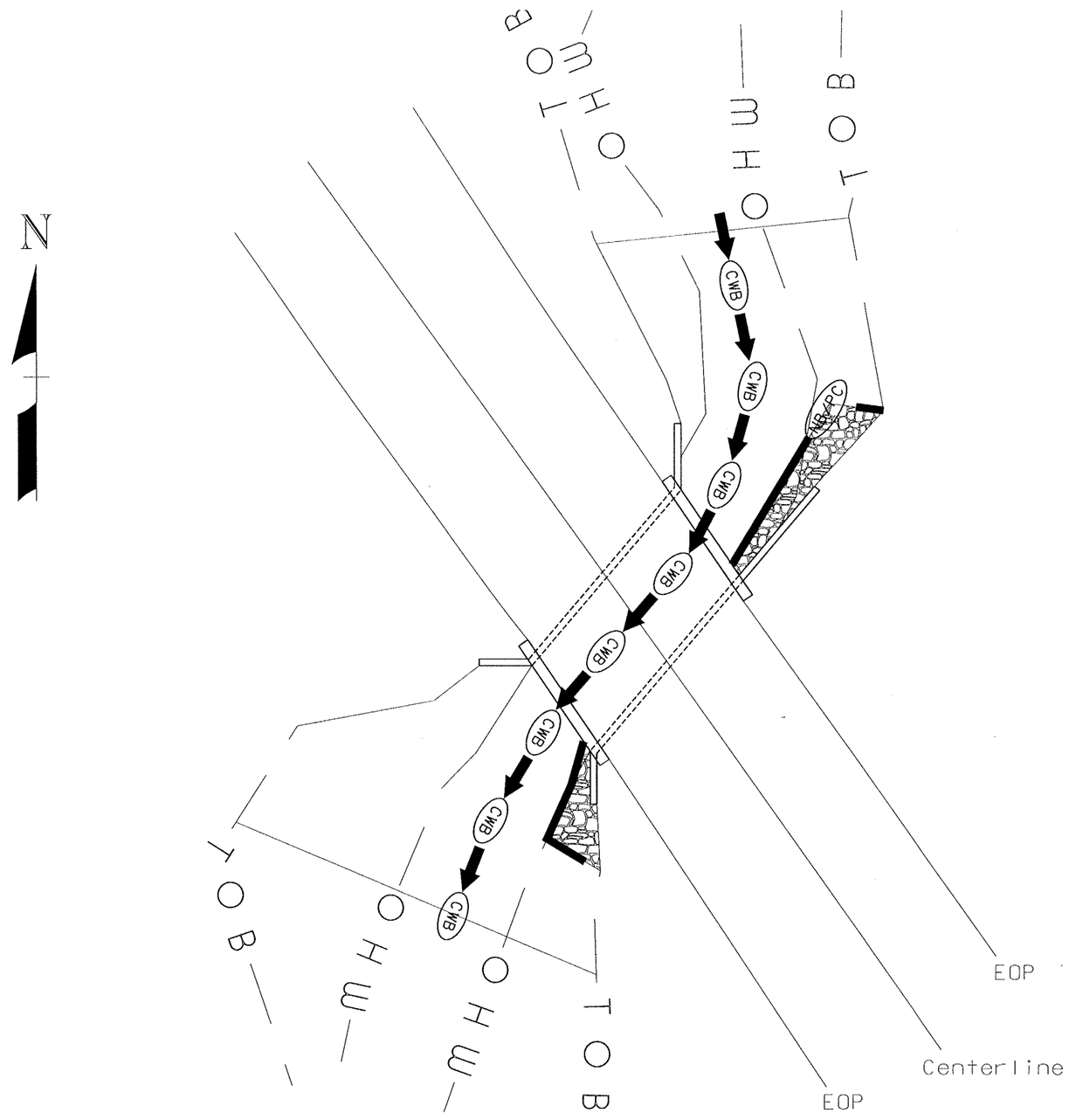
WETLAND IMPACT PLAN

BRIDGE SHEET 2 OF 3

REVISIONS AFTER PROPOSAL	BY	DATE		BY	DATE
	DESIGNED DBL	3/15/19	CHECKED		
	DRAWN DBL	3/15/19	CHECKED		
	QUANTITIES		CHECKED		

ISSUE DATE		FISCAL YEAR	CREW	SHEET NO.	TOTAL SHEETS
REV. DATE		2012	01	2	3

FILE NUMBER DIXVILLE 206/101



EROSION CONTROL PLANS

SCALE: 1" = 20'-0"

EROSION CONTROL PLAN LEGEND

PC — PERIMETER CONTROL

- SILT FENCE
- EROSION CONTROL MIX BERM
- EROSION CONTROL MIX SOX
- TURBIDITY CURTAIN
- SHEET PILE
- COFFER DAM

NB/PC — NATURAL BUFFER/PERIMETER CONTROL

- SILT FENCE
- EROSION CONTROL MIX BERM
- EROSION CONTROL MIX SOX
- TURBIDITY CURTAIN
- SHEET PILE
- COFFER DAM

CP — CHANNEL PROTECTION

- STONE CHECK DAMS
- STRAW WATTLES
- CHANNEL MATTING
- CLASS D EROSION STONE
- CLASS C STONE

CWB — CLEAN WATER BYPASS

- PUMP THROUGH PIPE
- DRAIN THROUGH PIPE OR CHANNEL

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION * BUREAU OF BRIDGE MAINTENANCE

TOWN DIXVILLE BRIDGE NO. 206/101 STATE PROJECT 42398

LOCATION NH 26 OVER FLUME BROOK

EROSION CONTROL PLANS

BRIDGE SHEET 3 OF 3

REVISIONS AFTER PROPOSAL		BY	DATE		BY	DATE
	DESIGNED	DBL	3/15/19	CHECKED		
	DRAWN	DBL	3/15/19	CHECKED		
	QUANTITIES			CHECKED		
	ISSUE DATE		FISCAL YEAR	CREW	SHEET NO.	
	REV. DATE		2012	01	3	

FILE NUMBER DIXVILLE 206/101

TOTAL SHEETS 3

HY-8 Analysis Results

Crossing Summary Table

Culvert Crossing: Crossing 1

Headwater Elevation (ft)	Total Discharge (cfs)	Dixville 206/101 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
2.72	150.00	150.00	0.00	1
3.28	199.90	199.90	0.00	1
3.82	249.80	249.80	0.00	1
4.33	299.70	299.70	0.00	1
4.84	349.60	349.60	0.00	1
5.33	399.50	399.50	0.00	1
5.82	449.40	449.40	0.00	1
6.31	499.30	499.30	0.00	1
6.84	549.20	549.20	0.00	1
7.46	599.10	599.10	0.00	1
7.72	649.00	619.13	29.73	7
7.50	602.54	602.54	0.00	Overtopping

The existing structure will pass the Q50 storm event prior to overtopping the roadway (NH 26). The proposed work, concrete toewall along the east abutment and replacing existing rip rap, will have a nominal effect on potential flooding or overtopping at this crossing.

Timothy Beedey, P.E.
NHDOT - Bridge Maintenance

Hydraulic Data (From NH StreamStats)

Drainage Area – 2.76 square miles

Flow – Q 50 = 539 cfs

The proposed structure will pass the 50 year flood.

Watershed Boundaries Map

			miles
APRAVPRE	Mean April Precipitation	3.427	inches
WETLAND	Percentage of Wetlands	0.4054	percent
CSL10_85	Change in elevation divided by length between points 10 and 85 percent of distance along main channel to basin divide - main channel method not known	463	feet per mi

Dixville 42398
Dixville 206/101 NH 26 over Flume Brook
NH StreamStats Data

Peak-Flow Statistics Parameters [Peak Flow Statewide SIR2008 5206]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	2.76	square miles	0.7	1290
APRAVPRE	Mean April Precipitation	3.427	inches	2.79	6.23
WETLAND	Percent Wetlands	0.4054	percent	0	21.8
CSL10_85	Stream Slope 10 and 85 Method	463	feet per mi	5.43	543

Peak-Flow Statistics Flow Report [Peak Flow Statewide SIR2008 5206]

PII: Prediction Interval-Lower, PIu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	PII	PIu	SEp	Equiv. Yrs.
2 Year Peak Flood	150	ft^3/s	91.5	246	30.1	3.2
5 Year Peak Flood	249	ft^3/s	150	415	31.1	4.7
10 Year Peak Flood	333	ft^3/s	196	565	32.3	6.2
25 Year Peak Flood	446	ft^3/s	253	785	34.3	8
50 Year Peak Flood	539	ft^3/s	297	978	36.4	9
100 Year Peak Flood	649	ft^3/s	345	1220	38.6	9.8

HY-8 Energy Dissipation Report

Scour Hole Geometry

Parameter	Value	Units
Select Culvert and Flow		
Crossing	Crossing 1	
Culvert	Dixville 206/101	
Flow	649.00	cfs
Culvert Data		
Culvert Width (including multiple barrels)	15.0	ft
Culvert Height	5.7	ft
Outlet Depth	3.78	ft
Outlet Velocity	12.59	ft/s
Froude Number	1.14	
Tailwater Depth	2.78	ft
Tailwater Velocity	9.58	ft/s
Tailwater Slope (SO)	0.0000	
Scour Data		
Time to Peak		
Note:	if Time to Peak is unknown, enter 30 min	
Time to Peak	30.00	min
Cohesion	Noncohesive	
D16 Value	0.00	mm
D84 Value	0.00	mm
Tailwater Flow Depth after Culvert Outlet	Normal Depth	
Enter all required input before computation will occur		

Input Values		
Variable	Value	Definition
V	12.59	outlet velocity (ft/s) >HY-8
S_s	2.6	Specific gravity of rock rip rap
g	32.2	gravitational acceleration (32.2ft/s^2)
y	3.78	critical depth (ft)
K_1	1.02	0.89 for a spill-through abutement
		1.02 for a vertical wall abutment
K_2	0.69	0.61 for spill-through abutment
		0.69 for vertical wall abutment

Froude Number	1.141174	**Froude Numbers (V/(gy)$^{1/2}$)**

Median Stone Diameter (D_{50})(ft)
1.691528963

Table 5.1. Minimum and Maximum Allowable Particle Size in Inches.

Nominal Riprap Class by Median Particle Diameter		d_{15}		d_{50}		d_{85}		d_{100}
Class	Size	Min	Max	Min	Max	Min	Max	Max
I	6 in	3.7	5.2	5.7	6.9	7.8	9.2	12.0
II	9 in	5.5	7.8	8.5	10.5	11.5	14.0	18.0
III	12 in	7.3	10.5	11.5	14.0	15.5	18.5	24.0
IV	15 in	9.2	13.0	14.5	17.5	19.5	23.0	30.0
V	18 in	11.0	15.5	17.0	20.5	23.5	27.5	36.0
VI	21 in	13.0	18.5	20.0	24.0	27.5	32.5	42.0
VII	24 in	14.5	21.0	23.0	27.5	31.0	37.0	48.0
VIII	30 in	18.5	26.0	28.5	34.5	39.0	46.0	60.0
IX	36 in	22.0	31.5	34.0	41.5	47.0	55.5	72.0
X	42 in	25.5	36.5	40.0	48.5	54.5	64.5	84.0

Note: Particle size d corresponds to the intermediate ("B") axis of the particle.

0.707107
0.707107

20.29834756

20.29834756 2.65618 1.37455

21.02857 6.126495

0

1.141174068 0.695511

8.346138 0.82853